UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/622,479	07/21/2003	Tsuyoshi Shibata	01272.020610	4521

5514 7590 06/30/2005

FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER	
HUFFMAN, JULIAN D	

ART UNIT	PAPER NUMBER
2853	

DATE MAILED: 06/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No.	Applicant(s)	
	10/622,479	SHIBATA ET AL.	
	Examiner	Art Unit	
	Julian D. Huffman	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 April 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 April 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 4-8 and 10-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Takahashi et al. (U.S. 5,838,342).

Takahashi et al. discloses:

With regards to claim 1, an ink jet printing apparatus which forms an image on a print medium by moving a print head (fig. 5, element 24) having an array of nozzles (fig. 15, n) and the print medium relative to each other and at the same time ejecting ink droplets from the nozzles according to print data of the image to be printed, the ink jet printing apparatus comprising:

nozzle information generation means (fig. 8, CPU 102) for generating nozzle information representing an ejection characteristic of each nozzle (column 10, lines 56-59) according to a landing state on the print medium of the ink droplets ejected from each nozzle (column 1, lines 39-43 and column 14, lines 10-13 and 32-35);

estimation means (CPU 102) for estimating, based on the nozzle information generated by the nozzle information generation means and the print data, an effect that

the ink droplet ejected from each nozzle has on the image to be formed (column 19, lines 55-58);

correction information means (CPU 102) for generating correction information to correct an ink ejection condition of each nozzle according to a result of estimation by the estimation means (column 19, line 66-column 20, line 8) and

control means (102) for controlling a driving of the nozzles according to the print data and the correction information (column 20, lines 4-8).

With regards to claim 2, the nozzle information generation means determines, as the nozzle information representing the ejection characteristic of each nozzle, an amount of deviation between an ideal landing position on the print medium of the ink droplet ejected from each nozzle of the print head and an actual landing position of the ink droplet on the print medium (column 1, lines 31-43 and column 14, lines 10-13 and 32-35, the nozzle information generation means determines the density, which represents a variation in landing position of droplets from an ideal position).

With regards to claims 4 and 5, the estimation means at least analyzes a component affecting a print density on the print medium, wherein the component is a range of print area to be printed by the ink dot and an area overrunning the range of print area (column 19, lines 3-8, fig. 28).

With regards to claim 6, the correction information generation means generates, based on an estimated result from the estimation means, the correction information to correct the ink ejection conditions of nozzles unable to produce an ideal landing state (column 20, lines 1-8).

With regards to claims 7, 8, 10 and 11, a method involving performing the functions outlined above as steps for forming an image in an ink jet printer.

With regards to claims 12 and 13, an ink jet printing apparatus which forms an image on a print medium by moving a print head having an array of nozzles and the print medium relative to each other and at the same time ejecting ink droplets from the nozzles according to print data of the image to be printed, the ink jet printing apparatus comprising:

grayscale correction means (CPU 102) for performing an ink dot grayscale correction according to density difference data representing a density difference between an actual density of an ink dot formed on the print medium and an ideal density of the dot (column 12, lines 49-67 and column 20, lines 60-65);

deviation correction means (CPU 102) for performing a dot deviation correction based on deviation data representing an amount of deviation, or a difference, between an actual landing position of an ink dot formed on the print medium by the ink droplets ejected from each nozzle and an ideal landing position of the ink dot (column 1, lines 31-43, column 14, lines 10-13 and 32-35); and

control means (CPU 102) for selectively causing the deviation correction means to execute the dot deviation correction according to the amount of deviation and for controlling the grayscale correction means and the deviation correction means according to at least the density different and the amount of deviation (column 20, lines 60-65).

With regards to claims 23 and 24, a method involving performing the functions outlined above as steps for forming an image in an ink jet printer.

With regards to claim 14, when the amount of deviation of an ink dot of interest is found to be greater than a predetermined value, the control means causes the deviation correction means to execute the dot deviation correction (when the value is greater than an average value, correction is performed, column 19, lines 54-63).

With regards to claim 15, the deviation correction means corrects an ink ejection condition of at least one influencing nozzle that adversely affects an ink dot of interest in landing on the ideal landing position (column 20, lines 4-8).

With regards to claim 16, the at least one influencing nozzle includes at least one of a nozzle for ejecting an ink droplet to form the ink dot of interest and adjoining nozzles (column 21, lines 8-13).

With regards to claims 17 and 18, when the amount of deviation exceeds 10% or 25% of a nozzle pitch, the control means causes the deviation correction means to execute the dot deviation correction (Takahashi et al. corrects errors which cause a difference in density, a deviation greater than 10% or 25% causes a deviation in density, for example, an error of 1,000% would read on the claims and would surely be corrected by Takahashi et al.).

With regards to claim 19, the grayscale correction means corrects, based on the density data, an ink ejection condition of a nozzle corresponding to the density data (column 20, lines 4-8).

With regards to claim 20, the deviation correction means increases or decreases a volume of an ink droplet ejected from an influencing nozzle according to the amount of deviation, the influencing nozzle being a nozzle that adversely affects an ink dot of interest in landing on the ideal landing position (column 20, lines 66-67).

With regards to claim 21, the grayscale correction means increases or decreases a volume of ink droplet ejected from the influencing nozzle according to a magnitude of the density difference (column 20, lines 66-67, changing drive pulse or width affects the drop size).

With regards to claim 22, the control means controls the deviation correction means and/or the grayscale correction means according to nozzle information representing at least one ejection characteristic of each nozzle (density data represents an ejection characteristic of the nozzle), the at least one ejection characteristic including at least one of an ink ejection enable/disable decision for each nozzle and a size and/or shape of an ink dot (column 14, lines 10-14 and 32-35).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 3 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al. in view of Shioya (PGPUB 2001-0003458 A1).

Takahashi et al. discloses everything claimed with the exception of determining an ink ejection enable/disable decision for each nozzle.

Shioya discloses determining an ink ejection enable/disable decision for each nozzle based on a density difference (fig. 9, step S904). If a density difference is large, a disable decision is made and a complementary printing process is performed, while if the density difference is small, ink volume change is made to correct the density difference.

It would have been obvious to one having ordinary skill in the art at the time of the invention to incorporate the teachings of Shioya into the invention of Takahashi et al. for the purpose of enabling an image of good quality to be produced even when a nozzle has failed to such a degree that a density difference cannot be corrected through drop volume modulation (page 8, section 0104 and 0082).

Response to Arguments

5. Applicant argues that Takahashi et al. fails to disclose generating nozzle information representing an ejection characteristic of each nozzle according to a landing state on a printing medium of the ink droplet ejected from each nozzle and estimating based on the generated nozzle information and the print data, an affect that the ink

droplet ejected from each nozzle has on the image to be formed and generating correction information to correct an ink ejection condition of each nozzle according to the estimation result, as recited in independent claims 1 and 7. This argument has been considered and is deemed non-persuasive. Takahashi prints a test pattern and measures the density of the test pattern, which is affected by the drop size. Takahashi then corrects a density unneveness of each nozzle based on a difference from an average density. Takahashi then corrects the density unnevenness using the calculated difference. Since the density information is read from a test pattern printed on the page, this density information is representative of a landing state on a print medium. Since this information is then used to calculate a difference from an average density, an estimation of the effect that the nozzle has on the image is thereby calculated. Further, since printing is corrected based on this information, correction information is generated to correct the ejection condition of each nozzle according to this estimation.

Applicant's argument that Takahashi does not disclose performing a dot deviation correction based on deviation data representing an amount of deviation, or a difference, between an actual landing position and an ideal landing position of the dot, as claimed in claims 12, 13, 23 and 24, is noted. However, Takahashi teaches this feature since if a dot deviates from an ideal position, a resulting density on the page occurs and this change is detected by the density measurement and corrected by the device. For example, given a dot with a larger than ideal size, this dot will be formed at a different position on the print medium than a dot of a smaller size due to the varying amounts of surface area of each dot on the page (column 14, lines 10-13 and 32-35).

Further, in gradation recording (column 20, lines 60-65), multiple droplets are formed to create one pixel, such that pixels of varying densities are produced and thereby images of varying densities. Any variation in landing position of these dots forming a gradation image results in a measurable density difference. For example if a density value of 200 (from a range of 0-250) is the ideal density, such a density would require a number of dots in a single pixel to create this density value. A dot which deviates from its intended position, or has a deviation in size, will affect the gradation and density of the image. Takahashi measures and corrects for these errors.

Conclusion

6. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian D. Huffman whose telephone number is (571) 272-2147. The examiner can normally be reached on 9:30a.m.-6:00p.m. Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JH
24 June 2005

K. FEGGINS 4/05
PRIMARY EXAMINER